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Dialogue, Debate, and Discussion

To Be Friends, Not Competitors: A Story Different from Tesla Driving the Chinese Automobile Industry

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This interview contributes to the conversation around the automobile industry by focusing on the Chinese electric vehicle (EV) sector. Both of the discussants' research interests encompass China's industrial competitiveness, innovation, science and technology policy, and the evolution of Chinese manufacturing industries. Professor Feng Lu, the interviewee, has conducted continuous and substantial fieldwork tracing the development of the Chinese automobile industry. He was one of the first experts to urge the Chinese government to help local automobile manufacturers develop innovation capabilities and proprietary products. Further, his 2005 book, *The Policy Choice to Develop China's Automobile Industry with Independent Intellectual Property Rights*, profoundly influenced the national policy transition toward emphasizing in-house innovation.

As with Perkins and Murmann (2018), Lu expects lower barriers to entry within the industry following the introduction of EVs, but he differs with them on whether Chinese companies would replicate the success of Tesla and which group of companies might become dominant. Because it is difficult to develop automobile design capabilities, Chinese internet giants have shifted from competing directly with established internal combustion engine (ICE) car manufacturers to collaborating closely with them when entering the EV sector. As this discussion below will suggest, dominant players in the Chinese automobile industry of the future may not be the two groups strongest at present, but rather some new 'species' that successfully integrates new services and EVs, thus creating a new ecosystem around the automobiles.

HONG JIANG: Are the automobile industry's barriers to entry coming down?

FENG LU: They are. Capability requirements for new entrants have changed significantly since the introduction of EVs. And, for four reasons, it is now much

easier for Chinese players, whether internet companies or ICE car manufacturers, to enter the EV sector.

First, while product quality and technical performance make the difference in the ICE car sector, *customer experience* is central to success in the EV sector. This shift in emphasis has opened opportunities for Chinese players who are inexperienced or comparatively weak in ICE car manufacturing, allowing them to compete globally by developing better EVs. Success in the ICE car sector previously required long-term development of technological capabilities, establishing higher technical barriers to entry, and making it difficult for new entrants to challenge the dominant position of early movers and established ICE car manufacturers. In that EVs are intelligent vehicles, however, customer experience has become the focus, including the experience of driving an EV and the enjoyment of those services built into an EV-centered ecosystem. Integrating cars, IT platforms, and internet-based services may be even more important to a company than producing well-functioning cars. Thus, nascent entrepreneurs and existing companies in China attentive to internet-based customer experiences can leverage these capabilities within the EV sector and compete with dominant ICE car manufacturers.

Second, the local industrial system around the Chinese automobile industry is mature and complete, with local component suppliers and a local supply chain of automobile manufacturing now well established in China. More importantly, some Chinese ICE car manufacturers have developed internal capabilities for automobile design, development, and manufacturing, enabling ambitious Chinese players — new entrants or existing manufacturer s— to source and integrate necessary resources and capabilities locally, thereby more easily launching new models.

For example, Chinese ICE car manufacturers that took the lead in launching EVs such as SAIC[1] and Geely are able to design and develop new automobiles in house, while those bound to foreign architecture platforms for automobile design and development lag far behind. Of the three largest state-owned ICE automobile companies that formed joint ventures with dominant foreign players, two (DFAC and FAW) have depended heavily on foreign technologies and platforms in developing new products and have not entered the EV sector. By contrast, SAIC absorbed the imported technologies and developed some new engines and cars independently, while also starting a joint venture with Alibaba in 2016 to develop internet-connected vehicles. Other Chinese ICE car companies that have introduced EVs also enjoy in-house automobile-development potential. For example, Geely entered the automobile industry in 1997 and built in-house capabilities for car design and development, introducing several successful ICE cars after 2002. It acquired Volvo in 2010, a move which significantly enhanced the firm's technological capabilities. Geely created a new brand, LYNK & CO, in 2016, under which it introduced a Volvo-based shareable SUV, available as a hybrid, plug-in hybrid, or full electric propulsion vehicle.

EV startups and internet companies are also facilitated by local capabilities of automobile development and manufacturing. NIO, a Chinese EV startup that has attracted more than fifty strategic investors worldwide, chose to collaborate with JAC, a Chinese ICE automobile manufacturer, and outsourced all its manufacturing to JAC. Large-scale production started in September 2017, and NIO successfully put its first internet connected all-electric SUV on the market in December 2017. It would have been much more difficult for NIO to deliver the new SUV on scale if not for JAC's capabilities in automobile engineering and manufacturing. Chinese internet giants such as Baidu, Alibaba, JD, and Tencent have also collaborated with capable local automobile manufacturers, as in the joint venture of Alibaba and SAIC, thus utilizing the companies' collective experiences and capabilities.

Third, unlike what happened in the ICE car sector, Chinese players are not technologically inferior to foreign counterparts, and they started R&D on EVs around the same time. New entrants have therefore locally sourced advanced technologies more quickly and economically in the EV sector than in the ICE car sector. Compared to other nations, the Chinese government has more actively supported the development of EV technologies, sponsoring R&D projects on EVs on a national level early in the 1990s and initiating projects under the State High-Tech Development Plan in 2001. Moreover, while foreign players initially focused on hybrid vehicle technologies, only gradually shifting to EVs, the Chinese government was determined from the start to advance the technologies of all-electric vehicles. Chinese players can, therefore, parallel foreign competitors in some key EV technologies, such as batteries. Tesla and Panasonic formed a battery partnership where Panasonic would supply all the batteries Tesla needs, but Chinese companies are challenging Panasonic's position as the leading supplier of EV batteries. Considering output volume, the two largest Chinese competitors, BYD and CATL, produced 7.35GWH and 6.72GWH of batteries, respectively, in 2016. Both can match Panasonic in production scale, meaning China will replace Japan as the largest EV battery supplier. In terms of battery quality, while BYD follows a relatively low-cost, low-price technical trajectory for batteries, CATL takes on a more expensive but more advanced trajectory and has become the battery supplier for BMW and several other European car manufacturers. The technological gap between Chinese and foreign players in the EV sector is clearly smaller than it is in the ICE car sector.

Fourth, China is the largest EV market in the world. Chinese consumers purchased over 300,000 EVs last year, favoring Chinese entrants who register local demand. As the Chinese government provided substantial subsidiaries to EV customers, Chinese consumption of EVs expanded quickly. Although government subsidiaries for EV consumption may be cut in 2018, a local market exists. The sharp growth in sales of EVs suggests they will soon replace ICE cars in China. Indeed, while no foreign companies or their joint ventures introduced EVs to the Chinese market until 2014, sales increased dramatically the next year as the

number of 'new energy' cars in China went from 75,000 to 331,092. Noting this surge of interest, foreign companies immediately introduced a range of hybrid cars and EVs into China in 2015–2016.

HJ: Will internet giants soon defeat established automobile companies and dominate the Chinese EV industry?

FL: I doubt Chinese internet giants will replicate the story of Tesla by competing directly with established automobile manufacturers. I expect they will collaborate with automobile manufacturers, and get deeply involved in the EV sector, but not attempt to dominate the sector. This prediction is based not on theoretical inferences but rather my observations thus far of the development of the Chinese EV industry.

I expect that collaboration between internet giants and ICE car manufacturers will characterize the development of the Chinese EV industry for three reasons. First, it will take longer than expected for Chinese internet giants to acquire automobile development and manufacturing capabilities. Even Tesla took five years to have an EV for sale. Chinese internet and software companies entered the EV sector aggressively in 2015, but their initial intention was to hire automobile specialists from outside and to launch internet-connected EVs and autonomous EVs independently. Chinese automobile companies were anxious about internet companies reshaping the automobile industry and about automobile manufacturers being degraded to mere OEMs. However, one year later, both groups realized the mutual benefit of collaboration. The internet companies struggled to design and manufacture EVs on their own, a result evident in the case of Tesla's Roadster. EV design cannot be achieved by replacing an ICE powertrain with an electric one or by adding a new electric powertrain to an ICE car. To introduce a new EV requires a thorough redesign, something that is beyond the current capabilities of Chinese internet companies. As competition in the EV sector intensifies, there may not be enough time for Chinese internet companies to take on such tasks internally, which is why, in 2016, certain companies modestly decided to collaborate. Baidu, Tencent, and JD all invested in the startup NIO, for example, while Alibaba started a joint venture with SAIC, and Tencent established a strategic partnership with GAC.

Second, internet giants need not dominate automobile design and manufacturing to capture value from EV businesses. While internet companies have a stake in the EV sector, their business interests differ from those of automobile manufacturers and transcend concerns over EV design or manufacturing. EVs are only part of the broad internet of things (IoT) that internet companies aim to build. These companies would benefit from connecting everything, including EVs, by their services, and by building an ecosystem; but this does not require them to dictate every industry connected through internet services. Internet giants are better served expanding their coverage of internet-based service platforms

than investing in learning how to design, develop, and produce cars. For example, Tencent would be happy enough if all the cars, trains, and other transportation vehicles were connected via WeChat (Tencent's IM software), even as the company would not plan to dominate those industries.

Third, for reasons perhaps related to history and relative power, internet companies and automobile manufacturers in China collaborate more easily than their American counterparts. The U.S. automobile industry, symbolized by Detroit, and the heart of American internet enterprises, Silicon Valley, have long distrusted each other. American automobile manufacturers have a glorious history of innovation, such as the Ford Production System, and incumbent automobile companies have developed strong routines of which they are proud. Similarly, the internet industry in the U.S. has, from the start, been dominant, with internet companies also finding their routines and capabilities a good fit for the environments in which they exist. Because of this mutually felt confidence, compromise between them has been a challenge. By contrast, the Chinese internet and automobile industries are capable of working together. In fact, ambitious Chinese internet companies are always looking for chances to innovate in this way, and Chinese ICE car manufacturers, less constrained by history and routines than their American counterparts, are also happy to collaborate with internet companies in the hope of becoming leading players. This is perhaps why Chinese internet companies quickly retired in-house EV-development efforts in 2015, turning instead to external collaboration.

HJ: What will be the potential ramifications of entry in the Chinese EV sector?

FL: I see three ramifications. The first is incumbent ICE automobile companies entering the EV sector independently, such as Geely, which introduced LYNK & CO, a new EV brand. Such incumbents include automobile manufacturers and designers, with an example being Qiantu, a subsidiary of CH Auto. CH Auto, a spinoff of the Beijing Jeep Company, was founded in 2003 to provide automobile design and development solutions. The firm started an EV division in 2010 and tried to collaborate with automobile manufacturers to launch EVs, but there was little interest. CH was therefore determined to transit into EV manufacturing, resulting, in 2015, in the establishment of Qiantu, which will deliver its first all-electric sports car in mid-2018. If it can overcome financial problems and scale up production, Qiantu may become the first upstream enterprise to successfully expand as a manufacturer in the automobile industry.

The second ramification is joint ventures or collaborative relationships initiated by incumbent automobile manufacturers and internet companies, such as the joint venture between Alibaba and SAIC and the strategic partnership between Tencent and GAC are both of this kind. As noted above, Chinese internet companies do not intend to be dominant in these relationships.

The third ramification is disruptive startups whose founders understand both the automobile industry and the internet industry but did not originate within either one. A startup of this kind is NIO. The founder of NIO established an internet startup in 2010 to provide an on-line shopping guide for automobiles, mobile applications for automobile consumers, and internet-integrated marketing solutions for automobile manufacturers. The company is a bridge between automobile dealers, automobile manufacturers, and large web portals, and its founder gained expertise in both industries. Thus NIO quickly integrated internet and automobile specialists from around the world and attracting a number of global internet giants as strategic investors.

HJ: Which ramification is most likely to be the winner in the future EV sector?

FL: The winners in the Chinese EV sector could be neither the current internet giants nor large automobile manufacturers, but rather some new 'species' we cannot currently imagine because a completely new ecosystem will emerge. Some unanticipated internet-connected services have already been introduced to enhance customers' experiences with EVs, but they are not necessarily under the control of incumbent enterprises. For example, NIO plans to make its EVs part of a courier service system, with the trunk of each vehicle connected to a cloud platform. Packages can be delivered directly to a trunk rather than a permanent address, allowing the EV owner to receive a package wherever she/he is at the time. Comparable services are coming soon, and new entrants who take the lead in introducing and integrating them into EVs may become the future leaders. It is hard to tell what these new entrants, or this new 'species', will be like, but it is likely they will emerge from cross-industry entrepreneurs positioned at the convergence between the internet and automobile industries.

HJ: How do you appraise the possibility that China becomes a global leader in the EV industry? What might be the advantages and disadvantage of Chinese players?

FL: China could, for the first time, become a leading player in the global automobile industry, but I cannot say whether the Chinese will win out eventually. If they do, the final winner will be the new 'species' that transcends the limits of both the internet and automobile industries.

One obvious advantage Chinese players have in the global market is that they've introduced many new features that cannot be found in Tesla's EVs, and they will quickly introduce more. NIO's EVs, for example, have been designed to support ride sharing, lifecycle management, and new internet-based services such as express delivery to a vehicle's trunk, as mentioned above. If these new ideas are successfully integrated into EVs, and if the new ecosystem is accepted by customers, Chinese players may become pioneers in delivering good customer experiences

with internet-connected EVs. Customers would then be less concerned whether a car comes from BMW or Mercedes, perhaps favoring Chinese EVs well supported by a complete service platform and thus giving Chinese players an advantage over foreign companies.

Chinese players are also served well because they design EVs to meet the local need of the Chinese market, the world's largest one. EVs designed by Tesla and other foreign companies may be technologically advanced but might still not fit well within the Chinese market. Tesla's cars, for example, are very expensive, pegged as they are to their price in the U.S. market. NIO's latest all-electric SUV is only half the price of a Tesla, but even then it's unclear if mainstream Chinese customers, especially younger customers, will be willing to buy one. By building an ecosystem around EVs, however, NIO will be able to attract those younger customers who cannot afford luxury cars, perhaps moving the company into a dominant position within the Chinese market.

HJ: Which way might be more promising for entrants in the EV sector, a vertical integration model like Tesla's or a model based more on outsourcing?

FL: It is hard to determine which is better, because the make-or-buy choice depends on the history and experiences of entrants. Disruptive startups that are inexperienced in automobile manufacturing, such as NIO, have selected contract manufacturing, while incumbent automobile manufacturers such as BYD and Geely, and their joint ventures with internet giants, naturally exploited existing manufacturing capabilities to implement a vertical integration model. It is theoretically possible that a new venture startup that integrates automobile design, development, manufacturing, and retail sales, as Tesla does, can come out in China, but this hasn't happened yet.

HJ: Who developed the software and platform operating system for EV companies in China? When internet companies that develop platform operating systems accumulate enough experiences on EVs, will they become the kingpins in the industry by handling industrial standards?

FL: Developers of operating systems differ across companies. NIO hired industrial specialists and collaborated with external players to develop its software and operating platform, while incumbent automobile manufacturers such as Geely hired experienced software engineers and internally developed an operating system. To do this, the joint ventures between automobile manufacturers and internet companies facilitated human resources from both sides.

There will be competition between different standards and platforms, but it won't come soon. In addition, it will take a while before different standards converge to make a new dominant design. Although Chinese internet companies

are currently participating in the transformation of the automobile industry, they have no intention of dominating the industry. They will collaborate with automobile manufacturers to set the new industrial standards but may not compete directly with the latter to become kingpins.

Table 1. Major Chinese Entrants in the EV sector

Type of company	*Company*	*Moves in the EV sector*
Internet giant	Baidu	- Establishing an autonomous vehicle division in 2015 with the intention to deliver autonomous vehicles within five years - Starting to develop autonomous driving software, internet-connected vehicle solutions, and vehicle-based big-data service for car manufacturers - Investing in NIO
	Alibaba	- Collaborating with SAIC in 2015 to develop internet-connected EVs - Developing intelligent driving platform
	Tencent	- Collaborating with GAC and announcing in 2017 a concept EV that is to be delivered on scale in 2018 - Developing internet-connected EV system and intelligent automobile platform - Holding a 5% stake in Tesla - Investing in NIO
	JD	- Investing in NIO
Incumbent ICE automobile manufacturer	SAIC	- Collaborating with Alibaba in 2015 to develop internet-connected EVs - Introducing two models of all-electric vehicles in 2017 under its proprietary brand Maxus - Founding two new joint ventures with CATL in 2017 to develop and produce EV batteries
	DFAC	- Founding a subsidy in 2001 to develop EVs - Having introduced several models of EVs - Holding stake in CATL
	FAW	- Introducing its first all-electric vehicle in 2017
	GAC	- Introducing a model of EV in 2014 under its proprietary brand Trumpchi - Introducing an all-electric SUV in 2017 under its proprietary brand Trumpchi - Establishing strategic partnership with Tencent in 2017 to collaborate in intelligent cars, internet-based services around EVs, and related areas
	JAC	- Introducing an all-electric vehicle in 2014 under its proprietary brand - Collaborating with NIO to manufacture all the new EV models introduced by NIO
	Geely	- Introducing a new model of EV in 2013 under its proprietary brand - Introducing a shareable all-electric SUV in 2017 under its new proprietary brand, LYNK & CO
	Qiantu	- Founded in 2015 as a subsidy of CH Auto to manufacture EVs - Announcing its first all-electric sports car to be delivered on scale in 2018

Table 1. Continued

Type of company	*Company*	*Moves in the EV sector*
Disruptive start-up	NIO	- Founded in 2014 as a global start-up with more than 50 strategic investors all over the world - Collaborating with JAC in 2016 to outsource manufacturing - Introducing an all-electric SUV in 2017 which is to be delivered on scale in 2018
EV battery supplier	BYD	- Founded in 1995 as a battery supplier - becoming one of the largest battery suppliers and integrating into automobile manufacturing in 2003 - Introducing an all-electric car in 2006 which was not approved by the central government to put into market until 2010
	CATL	- Formerly the division of power batteries of ATL - Turning an independent company in 2011 to focus on batteries of new energy automobiles - Collaborating with SAIC and DFAC

NOTE

[1] Brief profiles of the Chinese companies mentioned in the interview can be found in Table 1.

REFERENCE

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